SunCom, the Petitioners fail to show "an invasion of a legally protected interest" that is "concrete and particularized" and not "conjectural." Indeed, Petitioners' arguments -- like those of SunCom -- are based on several layers of assumptions and conjecture that in no way are fairly traceable to the Commission's *DEMS Relocation Order*.

Just as meritless is DIRECTV's argument that the *DEMS Relocation Order* violates its due process rights because it "has been engaged in developing an innovative plan to utilize the spectrum at 24.75-25.25 GHz."[59] A mere hope or intention to apply for licenses in the future does not support a showing of injury-in-fact, particularly where such licenses are unavailable under the existing allocation.[60] In fact, whether DIRECTV had actually been contemplating an "innovative plan" is irrelevant. Its eleventh-hour spectrum proposal is a belated attempt to conjure up an otherwise non-existent stake in the outcome of DEMS relocation.[61] In short, *none* of the Petitioners has existing licenses or timely applica-

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59 DIRECTV Petition at 2. Similarly, MWCA contends that the APA's rulemaking exceptions are unavailable to the Commission in this instance because the Commission's DEMS relocation "clearly affects [unidentified] MWCA members' ability to enter the 24 GHz DEMS marketplace." MWCA Petition at 12.

60 *SunCom*, 87 F.3d at 1388; *see also Energy Transp. Group, Inc. v. Maritime Admin.*, 956 F.2d 1206, 1215 (D.C. Cir. 1992); *MCI Communications Corp. and Southern Pacific Telecom. Corp.*, 10 FCC Rcd 1072, 1074 (Comm. Carr. Bur. 1994) (citations omitted).

61 DIRECTV's claim is similar to that made unsuccessfully by a *Bendix* plaintiff. After the Commission reallocated the 420 MHz band for exclusive government use, Bendix Aviation Corp. filed an application for an experimental radionavigation device for use on the evacuated band and claimed that due process dictated that its application be considered. *See Bendix*, 272 F.2d at 536. The Commission rejected Bendix's claim reasoning that, despite the merits of Bendix's proposal, the "Government need is paramount." *Id.* at 538.

tions in either the 18 GHz or 24 GHz bands and none has a legitimate interest to challenge the *DEMS Relocation Order*.

IV. The Commission Was Justified In Making Comparable Replacement Spectrum Available For Incumbent DEMS Licensees And Applicants

A. The Commission Has Always Sought to Make Incumbent Licensees Whole as a Result of Mandatory Relocation

In the *DEMS Relocation Order*, the Commission sought to "ensure that, to the fullest extent practicable, incumbent DEMS operations are able to provide service using frequencies in the 24 GHz band in a manner equivalent to their operations in the 18 GHz band."[62] Accordingly, it allocated sufficient spectrum for DEMS at 24 GHz to account for the effect that the higher frequency band will have on DEMS operations. In short, because of the laws of physics 100 MHz in the 24 GHz band is not comparable to 100 MHz in the 18 GHz band.[63]

The Commission consistently has held that the mandatory relocation of existing services must provide for new facilities or equipment that is "comparable to the relocated facilities."[64] Although the Petitioners question the Commission's general practice of making

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62 *DEMS Relocation Order* at 3476.

63 *See Establishment of a Spectrum Utilization Policy for the Fixed and Mobile Services' Use of Certain Bands Between 17.7 and 40 GHz, Notice of Inquiry*, Gen Dkt. No. 82-334, FCC 82-286, at Figure 2 (rel. July 9, 1982) (comparing rain and free space attenuation at 18.7, 22.4, 28.5, 31.15 and 38.0 GHz).

64 *See Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for Use by the Mobile Satellite Service, First Report and Order and Further Notice of Proposed Rulemaking*, ET Docket No. 95-18, RM-7927, PP-28, FCC 97-93, at ¶ 6 (rel. Mar. 14, 1997); *see also Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies, Third Report and*

(continued...)

comparable spectrum available in a mandatory relocation, they cite to no authority to the contrary. Several Petitioners even cite to the Commission's 2 GHz microwave relocation decisions,[65] but ignore the Commission's central findings in that proceeding. For example, the Commission's rules governing the relocation of incumbent microwave users from the 2 GHz PCS band require that such incumbents be provided with "comparable" replacement facilities that are "at least equivalent" with respect to (1) throughput, (2) reliability and (3) operating costs.[66] Because all three of these factors are "central to the concept of comparability," the Commission did not permit one factor, such as system availability, to be compromised by compensating with another factor, such as increased throughput.[67] There can be no doubt that the Commission's goal in mandatory relocations is to "ensure that incumbents are no worse off than they would be if relocation were not required."[68]

Likewise, in the *DEMS Relocation Order* the Commission sought to allocate sufficient replacement spectrum at 24 GHz so that DEMS licensees could provide service

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[64](...continued)
Order and Memorandum Opinion and Order, 8 FCC Rcd 6589, 6603-04 (1993) (relocated facilities must be "equal to or superior to existing facilities").

[65] BellSouth Petition at 17-18; MWCA Petition at 16.

[66] 47 C.F.R. § 101.75(b). *Amendment of the Commission's Rules Regarding a Plan for Sharing the Costs of Microwave Relocation*, 11 FCC Rcd 8825, 8839, 8845 (1996) ("*Microwave Relocation Order*"). Thus, WebCel's claim that information capacity is irrelevant to DEMS relocation, *see* WebCel's Petition at 15, is contrary to well-settled Commission precedent.

[67] *Microwave Relocation Order* at 8839, 8845.

[68] *Id.* at 8842-43.

equivalent to that at 18 GHz.[69] In doing so, the Commission based its allocation on the coverage, capacity and operations of DEMS systems at 24 GHz as compared to 18 GHz so as not to leave DEMS licensees in any worse position at 24 GHz. Further, because DEMS is licensed on an exclusive, wide-area basis, in determining the amount of spectrum that would be "comparable" at 24 GHz the Commission had to take into account the wide-area DEMS system designs for 18 GHz to ensure that, after relocation, DEMS licensees could deploy systems with equivalent throughput, reliability and operating costs.

The relocation process also reflects the fact that the DEMS Licensees (and other DEMS licensees) are *incumbent* licensees and applicants, *not* new entrants who may be required to obtain spectrum in an auction. Just as renewal licensees are not required to pay for licenses in an auction, incumbent licensees cannot be required to pay for *replacement* spectrum merely because their licenses are modified as part of a mandatory relocation. The fact that the Commission is auctioning spectrum as a means of distributing new licenses in other frequency bands is irrelevant to the DEMS relocation process.[70] Such auction authority cannot be applied to spectrum already held by incumbent licensees.[71] Petitioners' argument that the "additional" 300 MHz of spectrum allocated for DEMS at 24 GHz should be auctioned[72] is based on the simplistic and false premise that the 400 MHz DEMS allocation at 24 GHz is more than comparable to the 100 MHz allocation at 18 GHz.

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69 *DEMS Relocation Order* at 3475.

70 *See* BellSouth Petition at 19; WebCel Petition at 18.

71 *See* 47 U.S.C. § 309(j)(10) (use of competitive bidding authorized only for an "initial license or construction permit").

72 BellSouth Petition at 19.

B. The 24 GHz DEMS Allocation is Comparable to the 18 GHz DEMS Allocation

The Commission's 24 GHz DEMS allocation simply places DEMS licensees in a comparable position as at 18 GHz. To achieve this result, the Commission "reviewed the operations and proposed operations of incumbent 18 GHz DEMS licensees and evaluated the changes that would be necessary to provide equivalent operations at 24 GHz."[73] As demonstrated in the Commission's technical analysis and the materials in the Commission's public record, additional spectrum is required at 24 GHz to maintain equivalent capacity and path distances that DEMS systems were designed for at 18 GHz due to, among other things, differences in propagation and rain attenuation at 24 GHz compared to 18 GHz.[74] Moreover, NTIA concurred with the Commission when it made such additional spectrum available at 24 GHz.

In accordance with fundamental engineering principles, the Commission appropriately considered the following technical and public policy factors in connection with

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[73] *DEMS Relocation Order* at 3486 (Appendix B). Specifically, as reflected in the record, the Commission considered DEMS network designs with sectored point-to-multipoint nodal station antennas, with several different bandwidth allocation methods, and with multiple digital modulation methods.

[74] *DEMS Relocation Order* at 3486 (Appendix B). Because the Commission has unique expertise in the area of spectrum allocations, it is entitled to particular deference in this area. *World Communications v. FCC*, 735 F.2d 1465, 1468 (D.C. Cir. 1983); *see also A.L. Pharma, Inc. v. Shalala*, 62 F.3d 1484, 1490-92 (D.C. Cir. 1995). Here, the Commission engaged in reasoned decision making by relying upon facts in the record and providing a list of technical reasons justifying the amount of replacement DEMS spectrum. *See Simms v. NHTSA*, 45 F.3d 999, 1004-05 (6th Cir. 1995); *see also Greater Boston Television Corp. v. FCC*, 444 F.2d 841, 850-52 (D.C. Cir. 1970). Therefore, a reviewing court could not substitute its own judgment for that of the Commission. *American Radio Relay League v. FCC*, 617 F.2d 875, 879 (D.C. Cir. 1980).

the DEMS relocation. Each is relevant to the determination of how much spectrum would be comparable for DEMS at 24 GHz:

Rain Attenuation. The Commission appropriately used rain attenuation as the primary basis for determining the amount of DEMS spectrum needed at 24 GHz.[75] Rain attenuation has a substantially larger impact at 24 GHz than at 18 GHz, and is the largest single factor distinguishing propagation at 18 GHz and 24 GHz propagation. For example, based on ITU-R rain zone K and a 99.99% availability rate, the difference in rain attenuation between 18 GHz and 24 GHz is approximately 10 dB.[76] Thus, the Commission allocated sufficient spectrum to enable DEMS licensees to counter the effects of rain attenuation at 24 GHz to the same extent as at 18 GHz.

Cell Coverage Radii. The Commission appropriately based its analysis on a typical DEMS cell size of four to six kilometers, which is the same typical cell coverage radius designed by most existing DEMS licensees at 18 GHz. Had the Commission used a smaller coverage radius in its analysis, it would have irreparably imposed substantial additional costs on DEMS licensees at 24 GHz as compared to 18 GHz. For example, if an average DEMS cell radius is 5 km at 18 GHz, and if the Commission were to assume a

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75 *See* Jeffrey Krauss, "Rain and its Effect on Microwave Spectrum," *Communications Engineering & Design Magazine*, at 24 (May 1997).

76 *DEMS Relocation Order* at 3486 (Appendix B); *see also* Rec. ITU-R PN.837.1 and Rec. 838. The well-recognized ITU-R rain model is the international standard and provides rainfall data for 15 different rain zones. The U.S. is covered by six rain zones (B, E, D, K, M, N), with the least rainfall in western desert areas (zone B) and the most in the gulf coast area (zone N). Most of the east coast and the Midwest are covered by rain zone K.

DEMS cell radius of 3 km at 24 GHz, DEMS licensees would have had to install nearly three times more cell sites at 24 GHz than at 18 GHz.[77]

Availability Factor. The Commission appropriately assumed an availability rate of 99.99% for DEMS systems. An availability rate of 99.99%, which corresponds to an outage of 0.01% (52 minutes) per year, and sometimes higher, is widely used as the availability rate criterion for other services.[78] Therefore, only an availability rate of 99.99% or higher would ensure that DEMS systems can compete with incumbent local exchange carriers and other competitors and that 24 GHz DEMS systems are comparable to 18 GHz

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[77] The number of cells required to cover an area is inversely related to the cell area and therefore to the square of its cell radius (*e.g.*, (5x5)/(3x3) = 2.8).

[78] *See, e.g.*, Rec. ITU-R S.1068 (1994) at Section 2.1 (99.999% interference criterion into digital satellite receiver) and at Section 2.3 (99.99% interference criterion into analog TV satellite receiver); *Inquiry into the Dev. of Regulatory Policy in Regard to Direct Broadcast Satellites for the Period Following the 1983 Regional Admin. Radio Conf., Report and Order*, 90 FCC 2d 676, 700 n.55 (1982) (assuming 99.995% availability rate (*i.e.*, 26 minutes of outage per year) for microwave links, taking rain attenuation into account); *County of Los Angeles, Los Angeles, California; Aerospace and Flight Test Radio Coordinating Council, Memorandum Opinion and Order*, 102 FCC 2d 724, 728 (1985) ("*Los Angeles County*").

DEMS systems.[79] In short, a system design based on outages of more than 52 minutes per year would be unacceptable in the marketplace.[80]

Bandwidth Allocation Models. The Commission appropriately considered the effect of both Dynamic Bandwidth Allocation ("DBA") and Fixed Bandwidth Allocation ("FBA") models (consistent with both 18 GHz and 24 GHz DEMS system designs) in determining the amount of replacement DEMS spectrum. DBA achieves spectral efficiencies by taking advantage of "trunking efficiencies" and providing the ability to increase and decrease trunk group sizes as needed. In considering bandwidth allocation methods for DEMS systems, there are complex engineering tradeoffs between equipment complexity, interference, system capacity and service range. The Commission recognized the existence of such tradeoffs in its evaluation of DEMS systems' spectrum requirements and factored the difference between the FBA method and the more spectrum-efficient DBA method into its technical analysis.

Modulation and Coding. The Commission appropriately considered 16 TCM and QPSK modulation/coding methods in its analysis. Other radio services may employ a

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79 *See supra* Part IV(A). In the *Microwave Relocation Order*, the Commission stated that an incumbent system with an availability rate of *99.9999%* would have to be replaced with a system of at least an equivalent availability rate. *See Microwave Relocation Order* at 8841-42 n.78; *see also Los Angeles County,* 102 FCC 2d at 728 (affording 99.9995% availability factor (2.6 minutes of outage per year) to ensure that relocated system had equivalent availability rate as pre-existing system). Indeed, the ITU-R rain model provides explicit data for designing systems with even higher availability rates (*i.e.*, 99.997% and 99.999%). *See* Rec. ITU-R PN.837-1 (1994).

80 Even the Bell Operating Companies and other incumbent local exchange carriers ("LECs") utilize and advertise a minimum 99.99% availability rate. Anything less than that for DEMS would disadvantage DEMS in competing with these already entrenched operators.

variety of modulation methods. More complex modulation methods are generally more susceptible to interference, further decreased service range and other impairments. In contrast, less complex methods achieve a lower bits/second/Hz capacity. QPSK is a more conservative modulation technology that is relatively robust, while 16 TCM is more complex and less robust. Existing DEMS licensees have designed their systems to use both methods. Although more robust modulation and coding methods could have been considered, they would have carried fewer bits/second/Hz than QPSK with little performance improvement and thus would have required more spectrum at 24 GHz. If more complex modulation and coding methods were used they would have been so susceptible to interference and rain that they would have resulted in much smaller cell sizes at 24 GHz than at 18 GHz. Moreover, it is reasonable for a DEMS licensee to install technology that uses only one or two different modulation methods because of efficiencies in equipment commonality and ease of network layout, operations and management. Consequently, while there are an unlimited number of combinations of modulation and coding methods that could have been assumed, engineering judgment and network design considerations -- and the system design employed by DEMS licensees generally -- justify the primary use of QPSK and 16 TCM in the Commission's analysis.

Based on careful consideration of these relevant factors, the Commission determined that four times as much spectrum is required at 24 GHz to "permit DEMS systems to maintain equivalent information capacity to similarly engineered systems at 18 GHz."[81] The

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81 *DEMS Relocation Order* at 3475. Several Petitioners focus on factors that are not relevant to the amount of spectrum needed for DEMS at 24 GHz. For example,
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DEMS Relocation Order's allocation of sufficient replacement spectrum to allow relocated incumbents to construct and operate "comparable facilities" with respect to throughput, system reliability and operating costs is completely consistent with Commission precedent. As with any spectrum allocation, future technological developments may eventually lead to more efficient use of the 24 GHz band by DEMS licensees. It would be impossible and unprecedented for the Commission to attempt to base its determination of the amount of replacement DEMS spectrum on the possibility of such future developments when (1) DEMS licensees must design and deploy equipment for the 24 GHz band immediately and (2) such developments would be equally available to incumbent DEMS operators at 18 GHz if they were not required to relocate.[82]

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[81](...continued)
transmitter power, *see* WebCel Petition at 14-15, is not a significant factor in the difference between 18 and 24 GHz because whatever power levels are employed at 18 GHz, nearly the same power levels would be available at 24 GHz. Likewise, antenna gain is not a significant factor, *see* MWCA Petition at 16, because whatever antenna gains were employed at 18 GHz, the same size antenna at 24 GHz would produce about 2 dB greater gain for a directional user antenna. That 2 dB of gain, however, would be offset by a 2 dB or greater transmission loss at the higher frequency. In any event, larger antenna sizes would not be appropriate for many urban sites because of aesthetic concerns, installation costs and wind loading considerations. Other Petitioners ignore critical factors relevant to the determination of the amount of replacement DEMS spectrum needed at 24 GHz. *See* BellSouth Petition at 16-17; MWCA Petition at 15-16; WebCel Petition at 14-15.

[82] *See Electronic Industry Ass'n v. FCC*, 636 F.2d 689, 698 (1980) (Commission may not establish standards that are not currently attainable with existing technology, such as prescribing noise regulations that go beyond the present state-of-the-art). Although it is true that DEMS licensees may continue to operate in the 18 GHz band for the next three years, *see* BellSouth Petition at 16, DEMS licensees have no incentive to deploy equipment in the 18 GHz band on a large scale that they will have to remove before its useful life is complete.

V. The Sole Effect of the *DEMS Relocation Order* on Existing DEMS Licenses Is To Authorize 24 GHz Operations

Consistent with the Commission's precedent in similar mandatory relocations,[83] the *DEMS Relocation Order* and the *DEMS Modification Order* authorize 24 GHz operations pursuant to the exact same license terms and conditions as at 18 GHz. Nothing in the *DEMS Relocation Order* reduces the number of DEMS channels[84] or "change[s] the fundamental character" of DEMS.[85] Rather, the Commission has provided replacement spectrum only to incumbent DEMS licensees who hold validly issued licenses and who have timely constructed and operated DEMS systems.

The DEMS Licensees are established incumbents who have been licensed in the 18 GHz band for over two years and who are providing service to the public. Petitioners' complaints about the number of DEMS channels that the DEMS Licensees have in certain markets are exceedingly stale challenges against the DEMS Licensees' applications, which were filed as early as October 1993 and were granted between January 1995 and

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83 *See supra* Part IV(A).

84 In fact, after the relocation of incumbent DEMS licensees the Commission can auction additional common carrier DEMS licenses nationwide *to the same extent it could have at 18 GHz*. Similarly, after relocation the Commission can auction available private carrier, low-power 18 GHz DEMS licenses to the same extent it could have prior to relocation. *Cf.* MWCA Petition at 5 (claiming that there are fewer licenses available for auction after the relocation to 24 GHz). Incumbent private carrier DEMS licensees that are subject to significantly lower power limits than common carrier DEMS licensees remain in the 18 GHz band. *Compare* 47 C.F.R. § 101.147(r)(10) (maximum EIRP for low power systems is 1 watt) *with* § 101.113(a) (maximum EIRP for other DEMS systems is 55 dBw); *see also March 5, 1997 NTIA Letter* at Attachment A (distinguishing between full power "DEMS" and "low power" 18 GHz operations).

85 MWCA Petition at 17.

January 1996.[86] These DEMS licenses and the waivers contained therein were validly issued pursuant to the Commission's public application process and are no longer subject to administrative or judicial review.[87] In sum, nothing in the *DEMS Relocation Order* improves the status of existing DEMS licenses or otherwise "change[s] the fundamental character" of DEMS. The order simply authorizes replacement operations at 24 GHz and restricts future operations at 18 GHz.

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[86] MWCA Petition at 3. The Petitioners' preposterous contention that the *DEMS Relocation Order* gives the DEMS Licensees a *de facto* monopoly in some markets flagrantly ignores the notion of what constitutes a relevant market for antitrust purposes. Among other things, the DEMS Licensees are competing with many other service providers in the local exchange marketplace, including the Petitioners and other wireline incumbent and competitive local exchange carriers, future Local Multipoint Distribution Service ("LMDS") and WCS licensees, 38 GHz licensees, Commercial Mobile Radio Service ("CMRS") providers and others. Although Petitioners purport to be good Samaritans protecting the public from DEMS operators wielding significant market power, they are in fact wolves in sheep's clothing merely seeking to delay the competition that DEMS will bring and, at least in the case of BellSouth, preserve its local service monopoly for as long as possible.

[87] *See Committee for Community Access v. FCC*, 737 F.2d 74, 84 (D.C. Cir. 1984); *Springfield Television Broadcasting Corp. v. FCC*, 328 F.2d 186, 189 (D.C. Cir. 1964).

Conclusion

For the foregoing reasons, the Commission should deny the Petitions for Reconsideration, Partial Reconsideration, and Clarification of the *DEMS Relocation Order*.

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Dated: July 8, 1997

CERTIFICATE OF SERVICE

I, Jeffry A. Brueggeman, hereby certify that on this 8th day of July, 1997, true and correct copies of the foregoing Joint Opposition to Petitions for Reconsideration, Partial Reconsideration, and Clarification filed by Digital Services Corporation, Microwave Services, Inc., and Teligent, L.L.C. were served by hand delivery or by Federal Express (*) on the following parties:

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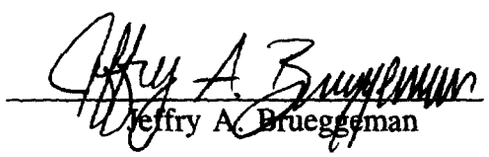

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